PART III

PHYSICAL DESCRIPTION

Physical Regions of Washington

On the basis of surface features, Washington may be divided into eight general regions. Agricultural settlement is influenced by factors of topography, climate, soil, forest vegetation and water resources distinctive to each of the physiographic regions. Each has become a different type of farming area as settlers have learned to adapt crops and livestock to the conditions, or have improved limitations through drainage or irrigation.

Coastal Plains

A narrow, sandy plain with shallow bays, tidal flats, stream deltas and low headlands lies between the coastline and the Coast Range. It extends from the Columbia River mouth almost to Cape Flattery, being widest and lowest in the Grays Harbor and Willapa Bay districts. The climate is mild and damp with a long growing season, but it is too cool, cloudy and wet for most crops. Originally this area was covered with heavy forests but much of it is now covered with woodlands. Lumbering and manufacture of wood products is the main industry. Farming is largely livestock and dairying on low uplands and drained areas in the lower Chehalis River Valley. Cranberry growing is important and well-adapted to numerous, boggy areas in the Grays Harbor and Willapa Bay sections. The shallow bays are also used for oyster culture. Fishing is common in the rivers and coastal banks.

Coast Range

The Coast Range is an uplifted area of sedimentary and metamorphic rocks divided into the Olympic Mountains and the Willapa Hills. The Olympics tower to nearly 8,000 feet in a dome-like structure, carved deeply by rivers. These mountains have the heaviest precipitation in the state. Snowfields and heavy forest cover the mountains. Most of the wilderness area is within the Olympic National Forest and Olympic National Park, being managed for recreation, wildlife and timber. Farm settlement is limited to some foothill river plains and coastal terraces such as the Dungeness and Port Angeles districts along the Strait of Juan de Fuca. Here in the lee of the mountains, rainfall is moderate and irrigation is practiced by some livestock farmers. The Willapa Hill country is wet, heavily forested and carved into numerous narrow valleys. Logging is the main industry, combined with livestock farming in the upper Chehalis River Valley and along the banks of the Columbia River. Wet climate, hilly topography and the difficulty of clearing stump land retards agriculture.

Willamette-Puget Sound Lowland

A broad lowland, described as a trough or valley, lies between the Coast Range and the Cascade Mountains. The northern part is the Puget Sound Lowland which has been glaciated and is occupied by the sea in the lowest sections. The continental glacier reached slightly south of Olympia. Under a warming climate it melted and geologists believe it receded about 25,000 years ago, leaving an infertile plain or moraines and outwash gravels, sands and clays known today as the Puget Glacial Drift Plain. Its rolling surface has numerous lakes and bogs.

Most of the major cities--Seattle, Tacoma, Everett, Bellingham and Olympia--have been built on moraines bordering the Sound. Rivers such as the Nooksack, Skagit, Snoqualmie, White and Puyallup have built up deltas and flood plains over the older gravelly plains. These narrow valleys are more fertile than the older glacial plains and support numerous small dairy, vegetable and berry farms. Most of the gravelly areas are wooded with a second-growth forest and are used for pastures. In the southern part of the Willamette-Puget Sound Lowland, there are two large valleys--the Cowlitz and Chehalis. They drain a low, hilly area with several flat prairies and bottom lands.

Agriculture is handicapped by poor drainage and flooding of the river deltas and plains, by heavy winter rainfall, by cloudy, but dry summers, by coarse, gravelly upland soils and by densely wooded land which is costly to clear. Advantages are mild climate and a location close to major markets for farm products such as milk, poultry and vegetables.

Cascade Mountains

The Cascades are a wide and high topographic and climatic barrier which separates western and eastern Washington. The range is made up of sedimentary, igneous and metamorphic rocks which have been carved by glaciers and streams. High, isolated volcanic cones of lava such as Mt. Adams (12,307 feet), Mt. Rainier (14,408 feet), and Mt. Baker (10,778 feet), appear upon the older Cascade rocks. The Cascade crest varies between 10,000 and 3,000 feet and is higher and more rugged in northern Washington. Roads and railroads have been built across its lower passes in central and southern Washington. The Columbia River has cut a deep gorge and the lowest pass through the barrier. The western slope is wet and heavily forested with Douglas fir. The eastern slope is drier with a less-dense pine forest. Nearly all classified as forest land, most of the area is in Federal ownership in five national forests and Mount Rainier National Park. Tree fruit farming in the eastern slope valleys of Wenatchee, Chelan, Methow, Naches and the Columbia Gorge is most important. Sheep and cattle summer grazing on alpine grasslands is another use. Deep western slope valley bottoms such as the Skagit, Snoqualmie, Nisqually, Cowlitz and Lewis also contain livestock farms. The area is vitally important as a source of water for irrigation and city drinking water and as a source of timber. Steep terrain, wet climate, short growing seasons and heavy forest vegetation are main handicaps for agriculture.

Columbia Basin

A low plateau of old lava rocks covered with stream and wind-deposited soils extends in a series of plains, ridges, coulees and hills from the Cascades to the eastern Washington border. The area is basin-like in structure, being higher around its margins and sloping inward to low and level central plains. It has been sharply eroded by the Columbia River and its interior tributaries, the Snake, Yakima, Palouse and Spokane Rivers. The basin has sub-areas created by crustal movements and erosion.

A. The Yakima Folds are a series of hilly ridges extending from the Cascades eastward into the lower part of the basin. The Yakima and Columbia Rivers have cut gaps through the ridges, and built up plains in the troughs between them. The rich, alluvial plain of the Yakima River is an important irrigated valley.

B. The Waterville Plateau is a tableland of thin soils overlaying basaltic rock at an elevation of 2,500 to 3,000 feet. It has gorges cut by the Columbia River and ancient glacial outwash streams once flowing in Moses and Grand Coulees. It is too high for irrigation and is used for dryland grain and livestock farming. The high plain is often called the Big Bend Country.

C. The Channelled Scablands is a belt of dry terrain carved by ice-age rivers into a series of coulees. Bare rock is exposed in the coulees. Small plateaus between the old river channels have thin soils used for dryland farming. The Grand Coulee of this region has been developed into a major irrigation reservoir.

D. The Palouse Hills consist of fertile deposits of wind-blown soil overlaying basaltic lava flows. After being deposited in large dunes, the formation was reshaped by streams into an intricate pattern of low, rounded hills which are tilled for wheat, barley and legumes. The hills receive 16 to 25 inches of rainfall annually and are composed of deep, porous and fertile soils. It is one of the richest farming areas of the Pacific Northwest.

E. The Central Plains are low and relatively level expanses of soil, deposited by old streams crossing the Channelled Scablands and later by the flooding of the Yakima, Columbia, Snake and Walla Walla Rivers. Climate is desert-like (6-12 inches of precipitation per year). The lower lands of the area, the Quincy and Pasco Basins and the Walla Walla Valley, are irrigated. The Quincy Basin is a new irrigation area watered by Grand Coulee Dam.

Agricultural handicaps in Columbia Basin regions are mainly found in its dry, continental climate. Large irrigation systems built since 1900 have overcome much of the need for water on rich valley and basin soils. Dryland farming in higher areas is practiced widely, although occasional variations in rainfall, lack of snowfall, winterkill, water and wind erosion inflict damage to field crops and to livestock ranges.

Okanogam Highlands

A portion of the Rocky Mountains, consisting of well-eroded old granites, lavas and sedimentary rocks extends across north-central Washington. These are the Okanogan Highlands, the state's richest mineral area. Summit levels reach 4,000 to 5,000 feet with peaks exceeding 7,000 feet. Prominent north-south valleys are ocuupied by irrigated tree fruit and livestock farms. These are the Okanogan, Sanpoil, Kettle and Colville Valleys. The Columbia River gorge through the Okanogan Highlands is occupied by the large man-made lake behind Grand Coulee Dam--Roosevelt Lake. Higher and wetter portions are forested with pine and larch and are managed for timber and for livestock ranges by the United States Forest Service and the Bureau of Indian Affairs. Cold winter temperatures, short growing seasons, dry valley climates and distance from markets are farming handicaps.

Selkirk Mountains

The Selkirks, a range of the Rocky Mountain system, extend into the northeast corner of Washington. The rocks are old mineralized granites and metamorphics reaching elevations of over 7,000 feet. The Pend Oreille River Valley at the base

of the Selkirks is an agricultural area of narrow bottom lands settled by livestock farmers. Nearly all of the uplands are in Kaniksu National Forest. While climate is cool and growing seasons are short, the Pend Oreille Valley has an advantage of being closely located to the Spokane metropolitan market area.

Blue Mountains

The Blue Mountains are an uplifted and eroded plateau extending into the southeastern corner of Washington. The strata are mainly ancient crystalline rocks which contain some minerals. The highest point of the mountains in the Washington section is Diamond Peak (6,401 feet), located on the divide between the Grande Ronde, Tucannon and Touchet Rivers. These rivers, and the Walla Walla River, have cut valleys into the plateau. Extensive pine forest and grassland areas are in the highlands within Umatilla National Forest, where rainfall is 30 to 40 inches. The Snake River has cut a deep valley and gorge across the lower parts of the mountains. The area is well developed agriculturally around its northern foothills where wind-blown soils are deep and irrigation systems are used. The Walla Walla and Tucannon Valleys are rich grain, legume and livestock areas of irrigation and dry farming. Grazing is an important use of the highlands by livestock ranchers in the upper valleys.

Topography of Whatcom County

The topography of Whatcom County is marked by sharp contrasts. It varies from delta plains of the Nooksack River at sea level on Puget Sound to the summit of Mt. Baker at 10,778 feet. Whatcom lies within two distinct physiographic regions. The first is the Willamette-Puget Sound Lowland, which, in western Whatcom County, consists largely of the Nooksack River plain. The second is the Cascade Mountains and the western foothills, which extend over the major part of the county.

The alluvial plain of the Nooksack River in the western part of the county is the area's most important physical feature in terms of settlement and agriculture. Over the centuries, the Nooksack River has transported enough sediment from the Cascade Range to fill in a large area once occupied by the sea. The river continues to fill in Bellingham and Lummi Bays. The alluvial plain extends more than 20 miles north from Bellingham, to the Canadian border, and about 25 miles inland. The terrain is relatively level, with a few low, poorly-drained sections of lakes and marshes. The Nooksack River meanders slightly above sea level and periodically floods areas between Lynden and Ferndale. Just east of the alluvial plain near Deming, the north, middle and south forks of the Nooksack River come together to form the main stream. In the Cascade foothills, the valleys formed by these rivers are narrow and surrounded by forest-covered ridges. Some of the upland areas and valley slopes are pastured or are in farm woodlands.

A portion of Whatcom County is in an exclave called Point Roberts. It is part of a lowland peninsula extending southward from the Fraser River delta plain in British Columbia. When the Canadian boundary was established along the 49th parallel, the lower three miles of the peninsula became a permanent part of the United States. American fishermen and farmers residing on Point Roberts travel by boat or by overland route through Canada in order to reach the rest of the county.

In southwestern Whatcom County, the uplifted and eroded rocks of the Cascade Mountains extend to the sea to form the Chuckanut Hills, and Eliza and Lummi Islands. When the glaciers of the Pleistocene period moved southward over the

Chuckanut Hills, they formed two lake basins in the area--Lake Samish and Lake Whatcom. Part of the city of Bellingham is situated on the lower slopes of the Chuckanut Hills. One of the first coal mining areas in the state was located near tidewater in this part of the county.

To the east, the Chuckanut Hills merge into the Cascade Range. The central and eastern part of Whatcom County is a scenic, heavily forested, mountain region lying in Mount Baker National Forest. In an effort to preserve some of the region's natural beauty, the Forest Service has set aside a large portion of eastern Whatcom County as the North Cascade Primitive Area. In recent years the volcanic peak and scenic alpine slopes of Mount Baker have become increasingly important for mountain recreation and winter sports.

Several dams have been constructed in the Cascade Mountain section of the county for the production of hydroelectric power. These include Ross, Diablo and Gorge Dams on the Skagit River, and Baker Dam on Baker River. Large reservoirs created as a result of dam construction are Ross Lake, Baker Lake and Diablo Lake.

Climate

The relationship of weather and climate to agriculture is very close. The climate of any region not only accounts for the patterns of plant life native to the area but is an important factor in what man shall grow there. Variations in weather may either stimulate or destroy crops in the process of development. These and other factors make weather and climate basic to the overall study of agriculture for any given area.

The climate of the western part of Whatcom County, which includes the agricultural areas, is predominantly a mid-latitude, west coast marine type with cool summers, rather mild winters, moist air and a small daily and annual range in temperature. Some of the factors which play an important role in the climate of Whatcom County are its proximity to the Pacific Ocean and other large bodies of water, coastal mountain ranges on the Olympic Peninsula and Vancouver Island, the Cascade Mountains and the southerly migration of storms moving out of the Gulf of Alaska during the winter and their return along a more northerly path in the summer

The coastal mountains on Vancouver Island and the Olympic Peninsula protect the county from the main force of storms moving eastward from the Pacific Ocean. Breaks in the coastal mountains and the Straits of Georgia and Juan de Fuca permit a large amount of moist air from the ocean to reach the area. This marine air is usually warmer in the winter and cooler in the summer than air over the interior of the continent at this latitude.

The Cascade Mountains shield the western part of Whatcom County from cold air in the interior during the winter and warm air in the summer. However, occasional cold air from the interior of Canada moves through the Fraser River canyon and spreads southward, bringing low temperatures to the Nooksack River plain. The lowest temperatures in the winter and highest in the summer are usually associated with easterly or northeasterly winds. The lowest humidity is observed when easterly winds are blowing down the western slope of the Cascades.

During the late spring and summer, the large high pressure area over the north Pacific spreads northward into the Gulf of Alaska. A clockwise circulation of air around the "high" brings a prevailing flow of air from a westerly and northwesterly direction into the county. Air from over the ocean is cooler and

Table 4. Temperature Data
Average Maximum, Average Minimum, Mean, Highest and Lowest Temperature Each Month
Whatcom County

Station		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Bellingham 2N (112' elev.) 1931-60	Av. Max.	43.9	47.9	52.1	58.8	65.1	69.1	73.8	73.9	69.7	61.0	51.6	46.7	59.5
	Av. Min.	29.7	31.1	33.8	37.2	41.3	46.4	48.2	47.2	43.7	39.2	34.5	32.5	38.7
	Mean	36.8	39.5	43.0	48.0	53.2	57.8	61.0	60.6	56.7	50.1	43.1	39.6	49.1
	Highest	64	66	72	82	85	92	94	91	90	83	71	67	94
	Lowest	-4	-3	10	19	22	29	34	34	27	22	3	5	-4
Blaine 1E (45' elev.) 1931-60	Av. Max.	42.9	46.3	51.2	58.0	64.7	69.5	74.1	73.0	67.7	58.1	49.8	45.6	58.4
	Av. Min.	30.5	32.0	34.9	38.8	43.8	48.4	50.6	49.9	46.1	41.6	35.6	33.2	40.5
	Mean	36.7	39.2	43.1	48.4	54.3	59.0	62.4	61.5	56.9	50.1	42.7	39.4	49.5
	Highest	64	62	72	78	85	92	94	92	86	77	64	62	94
	Lowest	-1	-9	11	21	26	34	37	38	30	20	17	6	-9
Clearbrook (64' elev.) 1931-60	Av. Max.	40.6	45.6	51.5	59.4	66.2	71.2	76.0	75.7	70.9	60.6	49.4	44.1	59.3
	Av. Min.	29.6	31.3	34.6	38.2	42.3	46.4	48.2	47.1	44.3	40.1	35.2	32.6	39.2
	Mean	35.1	38.5	43.1	48.8	54.3	58.8	62.1	61.4	57.6	50.3	42.3	38.4	49.2
	Highest	61	65	74	86	91	96	102	98	94	84	69	62	102
	Lowest	-3	-1	9	21	28	31	34	33	28	20	8	7	-3
Diablo Dam (891' elev.) 1931-60	Av. Max.	37.3	41.9	48.0	57.4	65.8	70.3	77.9	76.8	70.5	57.9	45.2	39.7	57.4
	Av. Min.	26.5	29.2	31.8	37.0	43.2	48.1	52.1	52.2	48.3	41.3	33.8	30.7	39.5
	Mean	31.9	35.6	39.9	47.2	54.5	59.2	65.0	64.5	59.4	49.6	39.5	35.2	48.5
	Highest	62	60	73	85	94	99	106	100	100	83	65	57	106
	Lowest	-8	-10	3	24	29	35	38	37	35	21	5	8	-10
Glacier R.S. (935' elev.) 1934-60	Av. Max.	37.4	42.2	48.9	58.6	66.2	69.5	76.5	74.2	69.5	58.2	46.3	40.9	57.4
	Av. Min.	24.8	27.5	30.1	34.4	40.1	45.6	48.5	48.3	44.3	38.4	32.0	29.4	37.0
	Mean	31.1	34.9	39.5	46.5	53.2	57.6	62.5	61.3	56.9	48.3	39.2	35.2	47.2
	Highest	67	69	78	84	94	98	101	98	94	80	64	66	101
	Lowest	-12	-7	-3	16	25	30	26	31	26	13	1	-9	-12
Mt. Baker (4,150' elev.) 1927-51	Av. Max.	32.5	35.6	38.5	43.1	50.5	56.2	63.9	66.1	57.3	49.5	40.2	34.7	47.3
	Av. Min.	21.3	23.8	25.6	28.4	36.0	39.4	44.1	47.3	41.4	35.5	29.1	23.3	32.9
	Mean	26.9	29.7	32.1	35.8	43.3	47.8	54.0	56.7	49.4	42.5	34.7	29.3	40.1
	Highest	70	61	69	72	70	80	91	86	84	77	70	59	91
	Lowest	-12	-11	6	6	18	24	34	36	27	12	5	-6	-12

Source: U. S. Weather Bureau, Climatological Office.

somewhat drier than the surface of the land and becomes warmer and drier as it moves inland, resulting in a dry season and pleasant temperatures during the summer. The driest weather usually occurs between the middle of July and the middle of August. During the late summer and fall, low clouds or fog frequently form at night and disappear before the following noon in the lowland areas.

The climatic pattern of the county is closely related to elevation. Temperatures, frost conditions, growing seasons and precipitation vary considerably from the shore of Puget Sound in the west to the Cascade Mountain divide in the east. Generally speaking, conditions are warmer and drier in the western lowlands of the county while the eastern mountainous area is cooler and much wetter.

At Blaine on the Canadian border, the average afternoon temperature in the warmest summer months is in the mid-70's and nighttime readings are near 50°. Maximum temperatures exceed 80° on a few afternoons and reach 85° in about one out of two summers. Slightly higher maximum temperatures can be expected in the interior agricultural areas because of the moderating influence of the Juan de Fuca and Georgia Straits on the land adjacent to the shore. Around Bellingham, the

summer average afternoon temperatures are similar to those at Blaine but nighttime temperatures are slightly lower.

In general, the average afternoon temperature in the winter ranges in the 40's and the nighttime temperatures in the upper 20's or lower 30's in the western part of Whatcom County. Temperatures in the mountainous eastern portion of the county are much colder because of the higher elevations and greater distance from the mild effects of the waters in the Straits.

The length of the growing season (the average number of days between the last occurrence of a 32 degree freeze in the spring and the first such occurrence in the fall) varies as much as several weeks within the county's agricultural area. The growing season near Blaine is around 180 days and generally runs from April 21 to October 18. A few miles north of Bellingham, the growing season usually extends from May 12 to September 30--about 141 days. For the county as a whole, the length of the growing season decreases in an easterly direction.

Table 5. Probability of Freezing Temperatures -- Whatcom County 1/

STATION	TEMP. (° F.)	PROBABILITY — SPRING					PROBABILITY — FALL					Growing Season Mean Length (Days)
		90%	75%	50%	25%	10%	10%	25%	50%	75%	90%	
Bellingham 2N	32	Apr 17	Apr 29	May 12	May 25	Jun 6	Sep 7	Sep 18	Sep 30	Oct 12	Oct 28	141
	28	Mar 19	Mar 30	Apr 13	Apr 27	May 8	Sep 27	Oct 7	Oct 20	Nov 1	Nov 11	190
	24	Feb 21	Mar 5	Mar 18	Mar 31	Apr 12	Oct 19	Oct 29	Nov 11	Nov 23	Dec 6	238
Blaine 1E	32	Mar 27	Apr 7	Apr 21	May 4	May 16	Sep 25	Oct 6	Oct 18	Oct 30	Nov 10	180
	28	Feb 27	Mar 11	Mar 24	Apr 7	Apr 18	Oct 16	Oct 27	Nov 8	Nov 20	Dec 1	229
	24	—	Feb 2	Feb 18	Mar 4	Mar 17	Nov 6	Nov 17	Nov 29	Dec 12	Dec 24	284
Clearbrook	32	Apr 10	Apr 22	May 5	May 18	May 31	Sep 7	Sep 18	Sep 30	Oct 12	Oct 23	148
	28	Mar 13	Mar 24	Apr 7	Apr 20	May 2	Sep 30	Oct 11	Oct 23	Nov 4	Nov 15	199
	24	—	Feb 6	Feb 23	Mar 8	Mar 22	Oct 24	Nov 4	Nov 16	Nov 28	Dec 11	266
Marietta 3NNW	32	Mar 26	Apr 7	Apr 20	May 4	May 16	Sep 17	Sep 28	Oct 10	Oct 22	Nov 2	173
	28	Feb 24	Mar 8	Mar 22	Apr 5	Apr 17	Oct 8	Oct 19	Oct 31	Nov 12	Nov 23	223
	24	Jan 25	Feb 7	Feb 22	Mar 7	Mar 19	Nov 1	Nov 12	Nov 24	Dec 6	Dec 17	275

Source: U. S. Weather Bureau, Climatological Office.

1/ To illustrate the data in the table, we find that the 50 percent probability of a 32° spring freeze for Bellingham is May 12. But there is also a 25 percent chance (1 year in 4) that a 32° freeze will occur as late as May 25, and 10 percent chance as late as June 6.

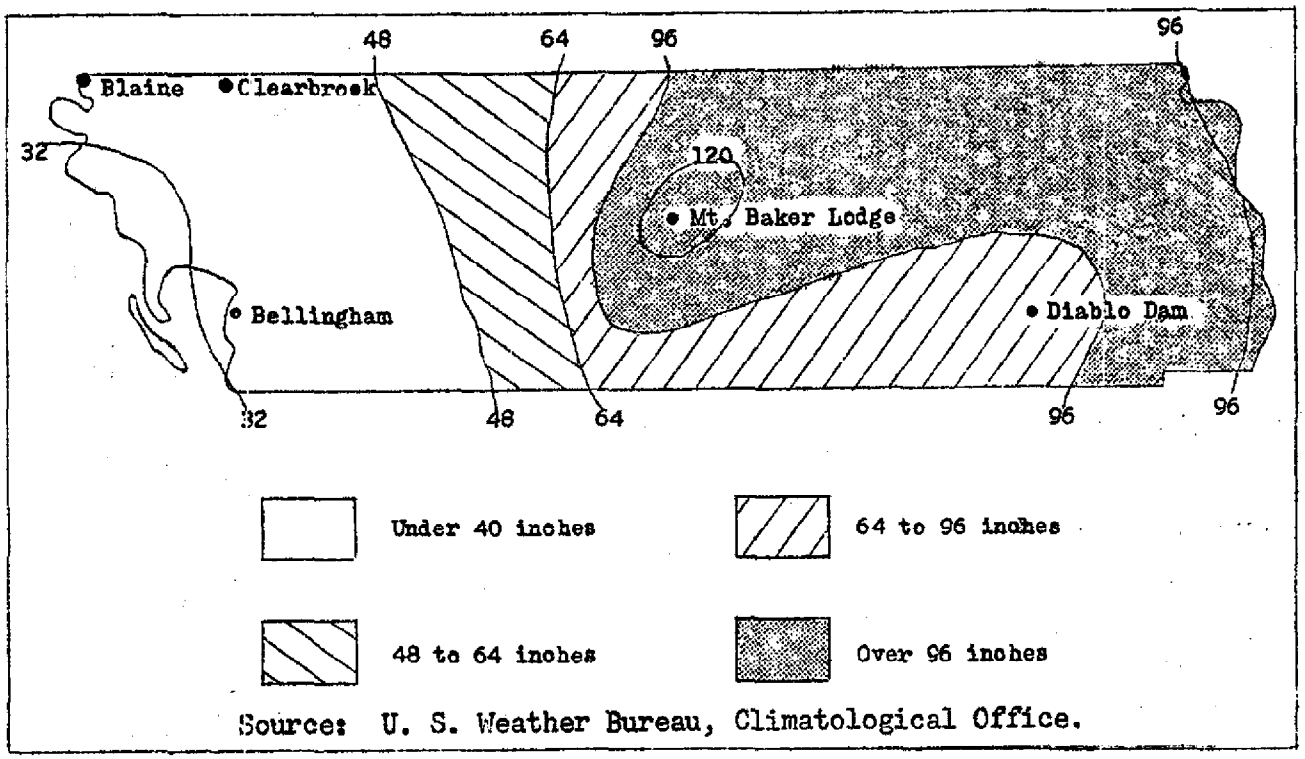
Isohyets (lines connecting points of equal precipitation) generally follow the contour lines in Whatcom County. Precipitation varies from an average of below 30 inches annually in the western part of the county to over 150 inches in the Mount Shuksan area in the center. In general, precipitation increases from west to east in the western half of the county to a maximum over the central uplift, and then decreases slightly with decreasing elevation to the eastern boundary.

There is a pronounced, though not sharply defined, rainy season and considerable cloudiness during the winter in the Bellingham area. About three-fourths of the annual rainfall (about 33.5 inches) is received from October through April.

Snowfall is rather light and on the average does not remain on the ground for long periods of time. December is the wettest month and July and August are the driest.

The area near Blaine receives about 41 inches of precipitation each year. Precipitation increases in October, reaching a peak in mid-winter, then decreases in the spring with a rather sharp drop in July and August. Most of the winter precipitation occurs as rain; however, snow has fallen as early as November and as late as March. A snow cover seldom remains on the ground longer than a few days or reaches a depth in excess of 4 to 8 inches.

Winter precipitation and snowfall increase rapidly in an easterly direction. Some of the heaviest snowfall and greatest snow depths in the United States have been recorded in the Mount Baker area. Elevations above 8,500 to 10,000 feet are covered with snow throughout the year.



Source: U. S. Weather Bureau, Climatological Office.

Figure 5. Distribution of Precipitation
Whatcom County

Table 6. Precipitation - Whatcom County

Station	Elevation (ft.)	Period of Record	Average Annual	Greatest Annual	Least Annual	Greatest Monthly	Least Monthly	Greatest Daily
Bellingham 2N	112	1931-60	33.59	48.61	21.13	11.71	0	2.95
Blaine 1E	45	1931-60	40.88	63.90	24.76	16.09	0	3.50
Clearbrook	64	1931-60	47.82	69.72	31.84	14.70	0	2.95
Diablo Dam	891	1931-60	71.56	94.72	45.86	26.49	0	6.49
Glacier R.S.	935	1934-60	58.03	79.59	39.39	17.92	0	4.65
Mt. Baker	4,150	1927-51	109.85	141.97	74.13	31.82	0	6.51

Source: U. S. Weather Bureau, Climatological Office.

Table 7. Precipitation for Selected Stations by Months
Whatcom County

Station	Average Monthly Precipitation (in inches)												Annual Total (inches)
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	
Bellingham	4.14	3.22	3.11	2.26	1.82	1.93	.99	1.10	1.98	3.64	4.51	4.89	33.59
Blaine	5.72	4.30	3.68	2.52	2.03	1.97	1.16	1.22	2.24	4.54	5.33	6.17	40.88
Clearbrook	5.75	4.52	4.47	3.18	2.63	2.58	1.46	1.57	2.92	5.27	5.72	6.74	47.82
Diable Dam	10.29	8.55	6.78	4.44	2.48	2.07	1.24	1.33	3.49	8.03	10.54	12.32	71.56
Glacier R.S.	7.03	5.60	5.59	3.71	2.90	2.92	1.42	1.75	3.64	6.69	7.48	9.30	58.03
Mt. Baker	11.86	10.61	12.12	8.52	6.39	4.73	3.32	3.19	7.64	11.34	13.14	16.99	109.85

Source: U. S. Weather Bureau, Climatological Office.

Forests and Wildlife

About 70 percent of Whatcom County is in forests. Douglas fir stands occur at the lower elevations throughout the county, but are replaced by hemlock and true firs as elevation increases. Hardwood stands, with red alder predominating, also are present at lower elevations. Many of these stands were established after the original softwood was logged. One or more softwood species are frequently a component of hardwood stands, and limited areas of lodgepole pine and western white pine are found occasionally. According to a Forest Service survey in 1957, about 574,872 of the 941,361 acres of county forest land were of commercial stands. The major commercial forest types are Douglas fir, Hemlock-Sitka spruce, hardwoods and fir-spruce. It was estimated that there were over 11 billion board feet of live sawtimber on the commercial forest lands in the county in 1957.

In 1957, about 42 percent of the commercial forest land in Whatcom County was in private ownership, 12 percent was state owned and less than one-half percent was divided between county and municipal holdings. The remainder, amounting to about 46 percent of the total commercial forest land, was federally owned or administered. Most of the Federal area was in the Mount Baker National Forest. According to the Washington State Department of Natural Resources, timber harvested from all ownerships in 1961 amounted to 105,280,000 board feet from nearly 4,000 acres.

Nearly everywhere, logging operations preceded settlement and establishment of farms in the county. The local forest industry has from its beginning provided seasonal or part-time employment for many Whatcom County farmers. According to the Census of Agriculture, over one-fourth of the county land in farms was in woodlands in 1959. In 1959, 151 Whatcom farms sold $140,426 worth of forest products off farm lands. About half of these farms sold standing timber valued at $64,245.

Washington State Game Department statistics show a valuable harvest of game and fur animal resources from Whatcom County's forests, streams, lakes and farmlands. In the 1962 season 1,350 deer were killed. Over 31,000 ducks, 5,360 pheasants, and 680 geese were bagged during the 1962 season. The Nooksack River is a leading sports fishing stream, particularly for steelhead. The wild fur catch during the 1962-1963 season in Whatcom County was as follows: 1,047 muskrat, 129 mink, 69 oppossum, 35 raccoon, 24 red fox, 21 civet cat, 14 skunk, 6 weasel, 3 marten, 3 coyote, 2 otter, and 1 bobact.

Land Classification and Soils

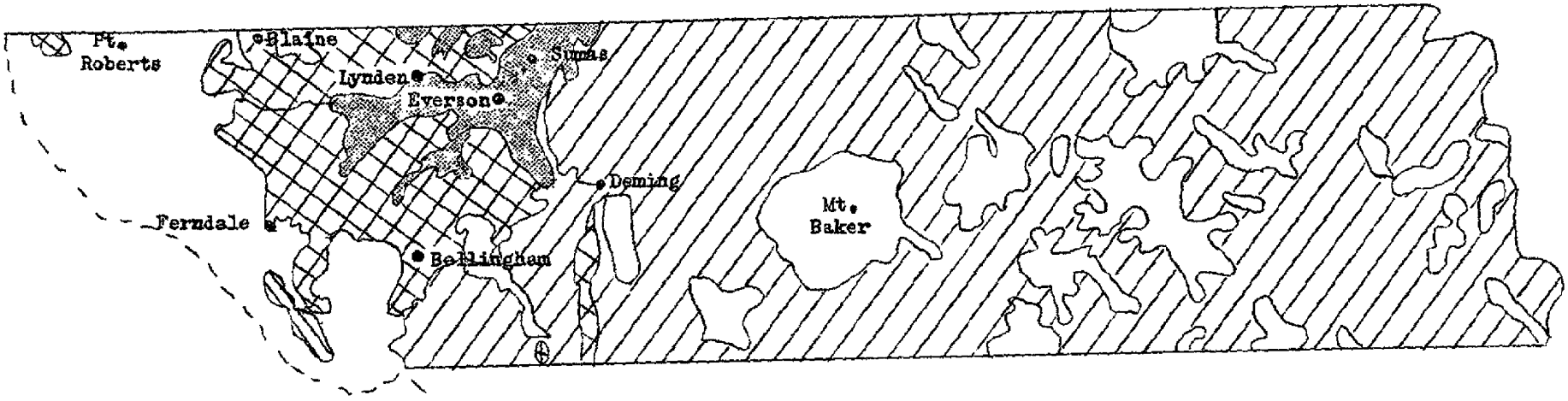
Soil characteristics in Whatcom County vary greatly because of the manner in which ancient glaciers and recent streams transplanted and deposited material in the lowlands and drainage channels. In general, most of the top soils of Whatcom County's agricultural areas were formed under forest cover and are characteristic of those found in regions of wet climate. These soils are acid and are high in organic matter. Soluble minerals have been removed through natural leaching. Lime and phosphate must be added by farmers to produce good crop yields.

The U. S. Soil Conservation Service has classified land in Whatcom County into eight broad categories according to its capability for use. The first four classes include land which can be plowed and cultivated safely, without lasting damage, if correct conservation procedures are followed. Class I land needs little special conservation treatment. Classes II, III and IV require increasing degrees of care and protection. The remaining four classes are not suited for cultivation. They need the protection afforded by a permanent cover of vegetation. Classes V, VI, and VII require progressively more care even when used for grazing or forestry. Class VIII land can be used safely only for wildlife, recreation, or watershed purposes.

Whatcom County's best agricultural areas--Class I and II lands--are located in the central portions of the Nooksack Valley from Ferndale to Sumas and Deming. Lynden is situated in the approximate center of this rich belt of alluvial soils. The most productive soils in this area are the deep, brown-colored loams found on the terraces above the Nooksack River flood level. These include the Lynden, Giles and Tromp silty and sandy loams located between Ferndale and Lynden. In the lower flood plains along the Nooksack River from Ferndale to Deming and Sumas are the brown and gray colored silty, clayey and sandy loams including the Pilchuck, Puget, Puyallup and Sumas. The Nooksack silty and sandy loams make up the deep and fertile bottomland soils in the Everson, Nooksack and Lynden vicinities. Large areas of Rifle peat in the area around Lynden and Wiser Lake have been drained and are highly productive.

Whatcom County's Class III, IV and V lands are largely found in the coastal area between Bellingham and Blaine. Soils are greatly intermixed but are mainly clays and wet delta soils. Lummi silty clay loam is found in the delta area of the Nooksack River adjacent to tidal flats. Some areas of the delta have been reclaimed by diking and are in hay and pasture, but a large part is tidal marsh. Land of higher elevation in the Lummi Indian Reservation and along the beaches include Cagey, Norma Hale and Kickerville loams formed from clay. Whatcom silt loam extends in a belt from Ferndale to Blaine. It is an area where the loam is underlain with clay. The land is only fair for agriculture and most of it is in woodland.

Class VI, VII and VIII lands include the hilly and mountainous areas--about three-fourths of Whatcom County. These lands include a variety of forest soils which are shallow and are coarse an texture. Some of the hilly areas used for pasture in the Chuckanut Hills near Bellingham have Squalicum and Alderwood silt loams. Barneston, Barnhardt, Schnorbush and Wickersham loams are found in areas used for pastures in the upper tributary valleys of the Nooksack River. The county includes large alpine areas which are too rocky, high and rugged for any forest growth or grazing use.



CLASS I AND II LAND: Soil of high and above-average productivity; net income per farm is high.

CLASS III AND IV LAND: Soil and terrain of fair quality for farming; farm incomes are average to low.

CLASS V, VI AND VII LAND: Hilly and mountainous terrain with poor soils; suited for grazing and forest growth only.

CLASS VIII LAND: High alpine, rocky areas unsuited for forest growth or grazing.

Source: U. S. Soil Conservation Service and Washington State Agricultural Experiment Stations.

Figure 6. General Quality of Land in Whatcom County